

CLAIMS

1. A bearing apparatus with a sensor, furnished with a rolling bearing including in that a plurality of rolling elements are incorporated between a rotary-side bearing ring and a stationary-side bearing ring,

a sensor enabling to detect conditions of the rolling bearing,

a ring shaped sensor cover housing the sensor inward and secured to the stationary-side bearing ring, and

a ring shaped presser member secured to a bearing housing or a shaft provided outside in a radius direction of the sensor cover,

wherein an opening is defined in a determined position of the sensor cover, and is provided at its peripheral part with projections standing toward the side of the presser member,

the presser member is formed with a cutout into which the projections are inserted for restraining rotation of the sensor cover.

2. The bearing apparatus with a sensor as set forth in claim 1, wherein a signal wire to be connected to the sensor is inserted in the opening.

3. The bearing apparatus with a sensor as set forth in

claim 1 or 2, wherein the projections are made by being bent to project a slash formed in one part of the sensor cover in a diametrical direction.

4. In a rolling bearing structured in that a plurality of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings,

a bearing apparatus with a sensor, comprising

a sensor for detecting conditions of a supported rotating shaft or of the rolling bearing,

a ring shaped sensor cover secured to one end face in an axial direction of a stationary-side bearing ring, and

a ring shaped sensor holding member secured to the sensor cover,

wherein the sensor is fitted in a sensor holding groove provided in a determined position along a circumferential direction in the sensor holding member with a determined tightening margin owing to elastic deformation of the sensor holding member.

5. The bearing apparatus with a sensor as set forth in claim 4, wherein the sensor holding member is fitted inward of the sensor cover with a determined space.

6. The bearing apparatus with a sensor as set forth in

claim 4 or 5, wherein the sensor holding member is formed with a plurality of positioning pins as projecting respectively in the axial direction, leaving determined spaces in the circumferential direction, and the sensor cover is formed with a plurality of fitting holes in respective positions corresponding to the plurality of positioning pins, and

the plurality of positioning pins are fitted in the plurality of respectively corresponding fitting holes, whereby the sensor cover and the sensor holding member are positioned.

7. The bearing apparatus with a sensor as set forth in claim 6, wherein the plurality of positioning pins are respectively inserted in the plurality of fitting holes, and the plurality of positioning pins passing through the plurality of fitting holes are plastic-deformed at front ends, whereby the sensor cover and the sensor holding member are fixed.

8. The bearing apparatus with a sensor as set forth in claim 6 or 7, wherein the plurality of fitting holes are formed in the circumference with projections standing toward the sensor holding member, and the sensor cover and the sensor holding member are engaged by means of the projections only.

9. The bearing apparatus with a sensor as set forth in any one of claim 6 to 8, wherein a circuit substrate of the sensor is held between the sensor cover and the sensor holding member, and the plurality of positioning pins of the sensor holding member pass through holes provided in the corresponding positions in the circuit substrate, and are inserted in the fitting holes.

10. In a rolling bearing structured in that a plurality of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings,

a bearing apparatus with a sensor, comprising

a sensor for detecting conditions of a supported rotating shaft or of a bearing,

a ring shaped sensor cover of a magnetic material secured to one end face in an axial direction of a stationary-side bearing ring,

a ring shaped sensor holding member of a non-magnetic material holding the sensor inward under a condition of being secured inward of the sensor cover, and

a conductive member installed as covering at least one part of the sensor holding member and has an electromagnetic shield effect.

11. In a rolling bearing structured in that a plurality

of rolling elements held in a holder are rotatably incorporated between a pair of bearing rings,

a bearing apparatus with a sensor, comprising
a sensor for detecting conditions of a supported rotating shaft or of a bearing,

a ring shaped sensor cover of a conductive member having an electromagnetic shielding effect secured to one end face in an axial direction of a stationary-side bearing ring, and

a ring shaped sensor holding member of a non-magnetic material holding the sensor inward under a condition of being secured inward of the sensor cover.

12. The bearing apparatus with a sensor or the rolling bearing with a sensor as set forth in claim 10 or 11, wherein the conductive member is provided as one body with the sensor holding member.

13. A rolling bearing with a sensor, comprising an inner ring, an outer ring, rolling elements interposed between the inner ring and the outer ring, a magnetic part to be detected provided to one of the inner ring and the outer ring, and a magnetically sensitive sensor provided to the other of the inner ring and the outer ring and being opposite to the magnetic part to be detected,

wherein any one of the magnetic part to be detected

and the magnetically sensitive sensor is secured to the inner ring or the outer ring via an attaching member of a magnetic substance.

14. The rolling bearing with a sensor as set forth in claim 13, wherein the magnetic part to be detected is a ring shaped multi-pole magnet of rare earth.

15. The rolling bearing with a sensor as set forth in claim 13 or 14, wherein the attaching member is fixedly caulked in a concave groove formed in an outer diameter of the inner ring or the outer diameter of the outer ring.

16. The rolling bearing with a sensor as set forth in claim 15, wherein the concave groove is formed in the circumference along the outer diameter of the inner ring or the outer diameter of the outer ring, and the attaching members are caulked in a plurality of positions equidistantly along the circumference.

17. The rolling bearing with a sensor as set forth in claim 16, wherein the number of the caulking positions follows the under mentioned formula,

$$(\text{the number of the caulking positions}) = nZ \pm X$$

herein,

n: positive integer

Z: the number of the rolling elements, and

X: integer of 2 or more

18. The rolling bearing with a sensor as set forth in claim 17, wherein the number of the caulking positions is prime.

19. In a rolling bearing having at least an outer ring, an inner ring, and rolling elements, any one of the outer ring and the inner ring is a rotating ring, while the other is a stationary ring,

a rolling bearing with a sensor, wherein an end face of a flat magnet is multi-pole magnet, and is secured to the rotating ring, and

a magnetically sensitive element is secured to the stationary ring in opposition to the flat multi-pole magnetic face, leaving spaces equidistantly in an axial direction of the bearing.

20. The rolling bearing with a sensor as set forth in claim 14 or 19, wherein the member of attaching the magnet to the rotating ring extends toward the stationary ring so as to close a vacancy of the bearing between the rotating ring and the stationary ring.

21. The rolling bearing with a sensor as set forth in claim 20, wherein the inner ring is the rotating ring, and the

, magnet attaching member is secured to a step portion in the inner circumference of the inner ring.